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Explanatory Memorandum to

COMMISSION REGULATION (EU) …/…

of XXX

laying down ecodesign requirements for light sources and separate control gears pursuant to Directive 2009/125/EC of the European Parliament and of the Council

and repealing Commission Regulations (EC) No 244/2009, (EC) No 245/2009 and (EU) No 1194/2012

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EXPLANATORY MEMORANDUM

1. CONTEXT OF THE PROPOSAL

Grounds for and objectives of the proposal

The Ecodesign Directive 2009/125/EC[1] establishes a framework for the setting of ecodesign requirements for energy-related products at EU level. Through this legislation the Union can improve the energy efficiency and other environmental aspects of products being sold in the single market.

Currently there are three Commission Regulations implementing Directive 2009/125/EC for the ecodesign of lighting products:

- Commission Regulation (EC) No 244/2009[2], as amended by Commission Regulation (EC) No 859/2009 and Commission Regulation (EU) 2015/1428, for non-directional household lamps, covering e.g. compact fluorescent lamps with integrated ballast (CFLi), halogen lamps (HL) and incandescent lamps (GLS). The requirements of this Regulation resulted in removing incandescent light bulbs from the market.
- Commission Regulation (EC) No 245/2009[3], as amended by Commission Regulation (EU) No 347/2010 and Commission Regulation (EU) 2015/1428, for lamps mainly used in office and street lighting, covering linear fluorescent lamps (LFL), compact fluorescent lamps without integrated ballast (CFLni) and high-intensity discharge lamps (HID). The requirements of this Regulation resulted in the removal of e.g. high-pressure mercury lamps from the market and also set requirements for control gears (ballasts).
- Commission Regulation (EU) No 1194/2012[4], as amended by as amended by Commission Regulation (EU) 2015/1428, for directional lamps (spots), including light emitting diodes (LED).

[1] Directive 2009/125/EC of the European Parliament and of the Council establishing a framework for the setting of ecodesign requirements for energy-related products (OJ L 285, 31.10.2009, p. 10).

[2] Commission Regulation (EC) No 244/2009 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for non-directional household lamps, OJ L76/3, 24.3.2009

[3] Commission Regulation (EC) No 245/2009 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for fluorescent lamps without integrated ballast, for high intensity discharge lamps, and for ballasts and luminaires able to operate such lamps, and repealing Directive 2000/55/EC of the European Parliament and of the Council, OJ L76/17

[4] Commission Regulation (EU) No 1194/2012 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for directional lamps, light emitting diode lamps and related equipment, OJ L342/1, 14.12.2012

The review of these regulations has been performed according to the respective revision clauses (Article (7) or (8) depending on the Regulation) during several studies: the 2013 'Stage 6 review study'[5], the 2014 'Omnibus study'[6], the 2015 'Market assessment on directional lamps'[7] and the 2015 'Lot 8/9/19 Preparatory study'[8], which integrates the results of the previous studies.

The Ecodesign Working Plan 2016-2019[9] established by the Commission in application of Article 16(1) of Directive 2009/125/EC sets out the working priorities under the ecodesign and energy labelling framework for the period 2016-2019. The Working Plan identifies the energy-related product groups to be considered as priorities for the undertaking of preparatory studies and eventual adoption of implementing measures, as well as the review of the current regulations.

Measures from the Working Plan have an estimated potential to deliver a total in excess of 260 TWh of annual final energy savings in 2030, which is equivalent to reducing greenhouse gas emissions by approximately 100 million tonnes per year in 2030. Lighting is one of the product groups listed in the Working Plan, with an estimated 41,9 TWh of annual final energy savings in 2030 (combined effect of ecodesign and energy labelling).

In addition, there are new policies that require the revision to look beyond the strict scope mentioned in the review articles of the existing implementing acts for lighting products: a renewed effort in carbon emission abatement through the Paris climate agreement[10]; the Commission's Circular Economy Action Plan[11]; the Better Regulation policy aiming at more efficient and effective legislation[12]; and the need to address possible circumvention of testing standards[13].

Following the conclusions of the 2015 preparatory study, the main objectives of this proposal are to:

- Simplify the ecodesign regulations for lighting products by integrating the three existing Regulations into one and unifying the way in which requirements are set. This is expected to reduce the administrative burden for industry and to facilitate market surveillance.
- Further facilitate compliance verification by market surveillance authorities by improving definitions for scope and exemptions (reduce risk of circumvention of the Regulation), clarifying the parameters to test and reducing number of test samples and test duration where possible.

5 Review study on the stage 6 requirements of Commission Regulation (EC) No 244/2009, final report, VHK/VITO for the European Commission, 14.6.2013

6 'Omnibus' Review Study on Cold Appliances, Washing Machines, Dishwashers, Washer-Driers, Lighting, Set-top Boxes and Pumps, consortium of VHK, VITO, Viegand Maagøe, Wuppertal Institut für Klima, Umwelt, Energie for the European Commission, DG ENER-C3, Brussels/Delft, April 2014.

7 Market Overview on Directional Mains-Voltage Lamps related to stage 3 of Commission Regulation (EU) No 1194/2012, VHK for the European Commission, 3 September 2015

8 Preparatory Study on Light Sources for Ecodesign and/or Energy Labelling Requirements ('Lot 8/9/19'), Task reports 0-7, VHK for the European Commission, October 2015. http://ecodesign-lightsources.eu/documents

9 COM(2016) 773 final, Brussels, November 2016.

10 http://ec.europa.eu/clima/policies/international/negotiations/future/index_en.htm

11 Closing the loop - An EU action plan for the Circular Economy". COM(2015) 614

12 http://ec.europa.eu/smart-regulation/better_regulation/key_docs_en.htm#_br

13 http://www.europarl.europa.eu/committees/en/emis/home.html

- Increase the minimum required energy efficiency of light sources to reflect technological progress made in recent years, in particular for LED technology. This will have as an effect to remove from the market some of the remaining less efficient light source types, thus capturing significant energy savings at EU-level and bringing economic advantages for users.
- Ensure that fully integrated luminaires (from which the light source cannot be removed) are in scope and that light sources contained in a product (e.g. mirrors, shelves…) can be accessible for verification.
- Align the verification procedure with the common approach used in Commission Regulation (EU) 2016/2282[14] and redefine the tolerances to be used during verification by market surveillance authorities.

General context

In 2015, around 1.7 billion light sources were sold in EU-28, of which approximately 22 % based on LED technology. In the same year, around 11.4 billion light sources were operating in EU-28, of which 6.5 % LED. These light sources consumed a total of 336 TWh/a of electricity, covering 12.4 % of the overall EU-28 electricity use. This corresponded to greenhouse gas (GHG) emissions of 132 megatons of CO_2 equivalent per year ($MtCO_2eq/a$), i.e. 2.8 % of the overall EU-28 GHG-emission.

Without the current Regulations, in 2015 the electricity consumption of light sources in scope would have been 41 TWh higher (377 TWh instead of 336 TWh), equivalent to the total final electricity consumption of Denmark and Lithuania together.

The evaluation of the impact of the Regulations also showed that electricity savings due to the existing requirements were expected to be 110 TWh in 2020, but according to the last estimation they will be limited to 70 TWh. The evaluation showed that the gap in energy savings is the result of:

(1) insufficient market surveillance by Member States;

(2) too many parameters to verify by market surveillance, and too expensive/long verification testing required (e.g. 6000 h test for lumen maintenance);

(3) unclear definitions for exempted lamp types ("special purpose lamps", as defined in the current legislation), using a description of intended use rather than measurable parameters;

(4) tolerances intended for use by market surveillance during verification that have been used also by manufacturers in the declaration of lamp characteristics, with the result to bring on the market products with an efficacy that is lower than the minimum required one;

(5) recent appearance on the market of ‘fully-integrated luminaires’ from which the light source cannot be removed for compliance verification.

Moreover, incandescent lamps, which the ecodesign legislation phased-out from 2009, were expected to be mainly replaced by compact fluorescent lamps. However, many consumers preferred the less energy-efficient halogen lamps. Fluorescent lamps have not been adopted as expected because of (real or perceived) sub-standard performance (e.g. colour rendering and temperature, ignition time, mercury hazards).

[14] OJ L 346, 20.12.2016, p.51.

The review is the occasion to tackle the abovementioned problems. Moreover, technology for light sources keeps evolving, thereby improving energy efficiency. LED technology, which is for almost all applications the most energy efficient lighting technology that exists, has had a rapid uptake on the EU market: from 0 % of sold lamps in 2008 to 22 % in 2015 with models on the market often being replaced by updated versions every six months to one year. In addition, the average energy efficiency of LEDs quadrupled between 2009 and 2015, and prices dropped significantly: compared to 2010, in 2017 a typical LED lamp for household use was 75 % cheaper and a typical LED lamp for offices 60 % cheaper. Without requirements adapted to technological progress, light sources used in the EU are expected to be less energy efficient than they could be, and EU consumers will lose out from buying slightly cheaper but more energy consuming products, because the lifecycle costs, which include energy consumption, will be higher. Without improved legislation, the potential to save energy would not be reached in time to contribute to achieving the EU's energy and greenhouse gas emissions reductions goals for 2030.

Consistency with other EU policies and objectives

Energy efficiency is a crucial element of the EU Climate and Energy Policy Framework and is key to moderate energy demand. The Ecodesign Framework Directive 2009/125/EC is an important instrument for achieving the Union's energy efficiency target set in Directive 2012/27/EU on energy efficiency.

The provisions of this Regulation are without prejudice to Directive 2011/65/EU[15] (RoHS Directive) with regard to the content of hazardous substances in light sources, in particular mercury. It is to be noted that the exemptions for mercury use in certain light sources currently valid under the RoHS Directive are undergoing a review: the corresponding delegated acts are expected to be finalised late 2018.

The provisions of Commission Regulation (EU) 2016/2282[16] with regard to the use of tolerances in verification procedures of the measured parameters by Member State authorities for lighting products are also added to this Regulation.

As for circular economy aspects, a main concern is the growth on the market of luminaires with non-dismountable light sources. In 2017 the Commission checked the possibility to have mandatory removability of light sources from luminaires, but there are technological drawbacks: many non-dismountable luminaires contain LED light sources and are manufactured so that LED light sources are tightly mechanically integrated to optimise thermal management and for protection purposes. The unsealing and resealing of LED lights in the luminaire (e.g. by a final user to replace the light source) may hamper their energy efficiency. At the same time there is evidence of the long lifetime of LED light sources (which can reach 10-15 years), which could translate into no real need to replace the light source during the time that the luminaire is used. Summing up, what is important at this point of time about the non-dismountable luminaires is that their energy performance is clear and verifiable: overall, energy consumption during the use phase is by far the most relevant environmental item for lighting products.

What the review does is thus to clarify that when a luminaire is not dismountable, it must be treated as a light source: that luminaire should comply with all the requirements set out for a light source, as explained in section 3.1 of this memorandum. This approach will stimulate

[15] OJ L 174, 1.7.2011, p. 88, and amendments.
[16] OJ L 346, 20.12.2016, p. 51.

manufacturers to find innovative solutions and design and set the ground for the next review of the legislation to investigate mandatory removability of light sources from luminaires.

Even though the mandatory removability of light sources from luminaires cannot be required at this stage, the proposed requirements for non-dismountable luminaires are in the spirit of a circular economy, because they will: (i) resolve the problem that market surveillance authorities have to test light sources when these are not accessible (thus improving the verification of energy efficiency goals); (ii) resolve the issue of an unfair level playing field for industry when the same light source type is accessible; and (iii) support consumers in their conscious choice when buying luminaires.

As for end of life, the producers of the lighting equipment in scope of the Waste of Electrical and Electronic Equipment Directive 2012/19/EU[17] (WEEE Directive) are in charge of meeting recycling and recovery targets that increase over time. In August 2018, the WEEE Directive introduced new recovery and recycling targets, including for lighting products. Because of the new WEEE requirements, this Regulation does not introduce further requirements for the recyclability of lighting products.

Parallel to the Lot 8/9/19 preparatory study on lighting products, a Lot 37 preparatory study on lighting systems was performed[18]. The recommendations of this study are currently being discussed in the context of Directive 2010/31/EU on the energy performance of buildings[19]. The proposed Regulation focuses on light sources and separate control gears, i.e. on some of the basic parts of a lighting system, while the work of Lot 37 focuses on design of luminaires, layout of luminaires inside a space, surface reflections inside the space, lighting calculations to verify if quantities of light required by standards are met and automatic control of lighting (switching on/off or dimming; use of occupancy and daylight sensors, etc.), possibly in the wider context of building automation systems. Lot 8/9/19 and Lot 37 are therefore complementary, and energy savings in the Lot 37 analysis have been estimated in addition to those of the Lot 8/9/19 study, using the same MELISA model, without double counting[20].

The proposed Regulation is developed in parallel with the proposed delegated act for energy labelling of lighting products.

2. CONSULTATION OF INTERESTED PARTIES AND IMPACT ASSESSMENT

Consultation of interested parties

Methods used, main sectors targeted and general profile of respondents

There was extensive consultation of stakeholders during the review studies, and before and after the Consultation Forum meetings. Further external expertise was collected and analysed during this process.

Stakeholders (industry, Member States, NGOs) were consulted during the Lot 8/9/19 review study on two occasions. A 1st stakeholder meeting was held on 5 February 2015 on the

[17] OJ L 197, 24.7.2012, p. 38

[18] Preparatory study on lighting systems 'Lot 37', final report 15 December 2016, VITO, VHK, Paul Waide and Kreios for the European Commission DG ENER C3, http://ecodesign-lightingsystems.eu/documents

[19] https://ec.europa.eu/energy/en/topics/energy-efficiency/buildings

[20] With Lot 8-9-19 in place, extra savings compared to BAU from Lot 37 would result in 10% of EU 28 electricity consumption for non-residential lighting at 2030: this low amount is the reason why the Commission's service is still analysing if the introduction of ecodesign requirements for Lot 37 is worthy.

MEErP[21] Task 0, 1, 2 and 3 reports; a 2nd meeting was held on 17 June 2015 on the Task 4, 5 and 6 reports.

Study reports were updated to reflect stakeholders' comments. Importantly, the future projections for LED prices and LED efficiencies used in the analysis of the MELISA model were agreed with industry. Stakeholder comments were also taken into account when preparing the Commission Working Document (WD) for the Ecodesign Consultation Forum (ECF) of 7 December 2015.

The comments on the 2015 WD showed a lack of consensus among stakeholders on the general approach, the level of ambition and on many details, especially on the ecodesign part. To resolve this situation following the 2015 ECF, between Spring 2016 and Spring 2017 further stakeholder meetings took place in an attempt to address the different comments. The MELISA model was extensively discussed with industry experts and adapted accordingly.

A second ECF took place on 7 December 2017.

An online public consultation (OPC) took place from 12 February to 7 May 2018, with the aim to collect stakeholders' views on issues such as the expected effect of potential legislative measures on business and on energy consumption trends.

The OPC contained a common part on Ecodesign and Energy labelling, followed by product specific questions on (i) refrigerators, (ii) dishwashers, (iii) washing machines, (iii) televisions, (iv) electronic displays and (v) lighting.

1230 responses were received of which 67 % were consumers and 19 % businesses (of which three quarters were SMEs and one-quarter large companies). NGOs made up 6 % of respondents, and 7 % were "other" categories. National or local governments were under 1 % of respondents, and 0.25 % came from national Market Surveillance Authorities.

The countries of residence of the participants were predominantly the UK (41 %) and Germany (26 %), with a second group of Austria, Belgium, France, the Netherlands and Spain comprising together some 17 %. Nine other Member States comprised another 9.5 % of replies, but residents in 12 EU Member States gave either zero or a negligible number of responses. Non-EU respondents comprised around 5 % of replies.

Almost all respondents (1229 out of 1230) answered the questions on lighting products. 719 participants (58 %) replied only on lighting.

Inception impact assessments for the regulatory measures on the review of ecodesign and energy labelling requirements for this product group were published on 26 January 2018 for feedback until 23 February 2018. In total 17 comments were received for the ecodesign measure and 16 for the energy labelling measure.

In general, all stakeholders are in favour of Ecodesign and Energy labelling requirements for lighting products. The submitted feedback commented amongst others on the strictness of Ecodesign requirements, the quality of light, the blue light content and requirements that would make light sources easily replaceable//repairable in containing products.

[21] MEErP is the methodology that the European Commission applies to make studies for ecodesign of energy-related products.

Impact assessment

An impact assessment (IA) is required when the expected economic, environmental or social impacts of EU action are likely to be significant. The IA for the review of regulations (EC) No 874/2012 and No 244/2009, No 245/2009 and No 1194/2012 was carried out between May 2017 and March 2018.

The data collected in the review studies served as a basis for the IA. Additional data and information was collected and discussed by the IA study team with industry and experts, and other stakeholders including Member States. During this process, several meetings were organised with industry and Member State experts. The additional data and information collection focused on:

- additional market data on energy efficiency for the period 2015-2017;
- update on lighting catalogues for the availability of LED replacements;
- fine-tuning of the requirements;
- fine-tuning of definitions;
- investigation of various options for the phase out of T8 lamps;
- sensitivity analysis regarding electricity tariffs;
- extended information on SMEs, possible impacts;
- extended information on specific sectors using T8 lamps.

The IA report was submitted to the Regulatory Scrutiny Board (RSB) on 16 May 2018. Following a meeting on 13 June 2018, on 18 June 2018 the RSB delivered a positive opinion with reservations. The draft IA was subsequently improved, based on the RSB's Opinion[22] and the horizontal and specific technical comments that the RSB sent prior to the meeting of 13 June 2018. Their main considerations and how these considerations were taken into account are outlined below:

(a) RSB: the report does not sufficiently analyse current exemptions, i.e. explain what they cover, why they remain relevant, alternative ways to close loopholes, and the associated impacts.

Action: an annex was added to compare exemptions in the current legislation with the exemptions proposed with this review.

(b) RSB: the report does not integrate circular economy aspects comprehensively and in a way which is consistent across ecodesign products. It does not assess them either.

Action: text was added to give a better explanation.

(c) RSB: The report should better present supporting evidence from the evaluation of the existing legislation. It should also clarify what expectations were of the original legislation, how outcomes have been different from what was expected, and what lessons to draw from this.

Action: a specific section and clarifications in an annex were added.

(d) RSB: the limitations and risks of the methodology behind assessing the impacts of the proposed measures should be better described.

[22] Ref. Ares(2018)3220771 - 18/06/2018

Action: text was added to give a better explanation.

Collection and use of expertise

Analysis model MELISA

The 'Model for European Light Sources Analysis, MELISA' was first developed during the Lot 8/9/19 preparatory study. Following the 2015 ECF it was extensively discussed with industry experts and adapted accordingly.

New methodology for setting energy efficiency requirements

In unifying the three existing ecodesign regulations for lighting products into a single regulation, a central element was the development of a unified method for setting energy efficiency requirements for all light source types. The result was a maximum power formula containing two parameters (a threshold efficacy and an end-loss factor), and bonus factors for special circumstances. Extensive work has been performed with industry experts to determine the values of the parameters and of the bonus factors (for each light source type) such that requirements using the new maximum power formula could be considered to be equivalent to the requirements in the existing regulations. Consensus was reached on these parameter values, which were used as the basis for proposing a higher level of ambition, i.e. to set more stringent energy efficiency requirements.

Flicker and stroboscopic effects

Experts from industry and from standardisation organisations have been consulted specifically on so-called 'temporal lighting artefacts' (TLA), including flicker and stroboscopic effects. This is an important topic for users, being potentially related to health problems or discomfort. Intensive contacts are also maintained with consultants for the Australian government and with experts working at NEMA – the US standardisation body, in an attempt to align regulations internationally on this point. Mainly based on expert advice, preliminary requirements on flicker and stroboscopic effects have been included in the proposed Regulation. The research and testing on this topic is very dynamic and the requirements will be reassessed during the revision of the Regulation.

Parameters to test and verification tolerances

The proposed parameters to be tested to verify compliance and the associated tolerances aim to create more clarity for market surveillance authorities.

3. LEGAL ELEMENTS OF THE PROPOSAL

Summary of the proposed action

By 2030, compared to a business-as-usual scenario, the proposed action will result extra energy savings of 41,9 TWh/yr and greenhouse gas emission savings of 14,3 $MtCO_2eq./a$, i.e. 2,88 % of the Commission's 2030 target for final energy consumption savings and 1,34 % of the Commission's 2030 target for greenhouse gas emissions savings.

1. Definition of the scope of the proposed Regulation

The scope of the measures are light sources and separate control gears, where 'separate' indicates control gears that are marketed as separate products, i.e. not integrated in the light source. Light sources and separate control gears as defined by this Regulation are always in scope, even when they are parts of 'containing products' such as luminaires, mirrors or shelves. However, the containing products themselves are not in scope of this Regulation (but they may be in scope of other ecodesign regulations). A tricky point is how to treat containing products (including luminaires) that cannot be taken apart (i.e. without permanent mechanical damage) to access the contained light source(s) and/or control gear(s) for compliance verification. Two options were investigated:

- Option 1: the entire product could be considered as the light source/control gear, and thus be subject to the requirements of the Regulation. This is expected to stimulate suppliers to make their containing products, including luminaires, dismountable, with replaceable parts, which is a first step to including requirements related to the circular economy (further steps intended to be taken following the next review of this Regulation). As mentioned in section 1 of this memorandum, many luminaires are manufactured so that LED light sources are tightly mechanically integrated to optimise thermal management and for protection purposes.

- Option 2: introducing already now the obligation that light sources and/or control gears in scope of the Regulation must be readily removed (meaning without permanent mechanical damage for both the light source/control gear and the containing product) from any product containing them that is placed on the market.

Despite the importance of the principle of circular economy with the recently adopted EU strategy and the focus on circular economy objectives in the Ecodesign Working Plan 2016-2019, as a general principle Option 1 was chosen. The possibility to have more stringent resource efficiency requirements will be reassessed during the review of the Regulation.

For containing products that are different from non-dismountable luminaires (e.g. shelves, mirrors), the proposal is already retaining some parts of Option 2: in order to allow compliance verification by market surveillance authorities, the proposal requires that light sources and control gears contained in a product must be removable for verification purposes and not permanently damaged (while the containing product can be damaged).

The scope of this Regulation covers all lighting technologies, including incandescent, halogen, fluorescent, high-intensity discharge and light-emitting diodes (both inorganic LED and organic OLED). This means that the proposed single lighting regulation will replace the three existing ecodesign regulations for lighting products.

To avoid that too many exemptions would have to be made for light sources with special characteristics or for use in special applications (increasing the risk of circumvention of the Regulation), the term 'light source' has been intentionally defined with the following limitations:

- emitting white light within specified chromaticity coordinates: this excludes from the scope e.g. coloured, ultraviolet (blue), infrared (red, gold), horticulture (purple), collagen (pink) lamps;
- density of light emission less than 1000 lumen per square millimetre, excluding from the scope e.g. light guidance applications, laser sources, photographic flash tubes, etc.;

- emitting between 60 and 82000 lumen of light. The lower boundary excludes from the scope a huge variety of dashboard-, status-display or other pilot lights as well as purely decorative lamps. The burden to verify compliance of these numerous small lamps would outweigh the small energy savings that could be obtained. The upper limit excludes very powerful lamps for e.g. sports lighting, theatre-, stage- and studio-lighting, and some outdoor and industrial applications. Higher efficiency (LED) lamps are not (yet) readily available for these high power lamps, while users tend to be professionals that already pay attention to energy efficiency;
- colour rendering index larger than zero. This excludes from the scope e.g. monochrome lasers and low pressure sodium lamps.

In addition to this limitation of the scope, exemptions have been made, following the precautionary principle, for light sources that are related to health and safety (e.g. explosive atmospheres, emergency lighting, nuclear installations, military installations and equipment, applications in medicine, lights for signalling, and lights in or on means of transport for persons and goods).

Other exemptions cover light sources with special characteristics (e.g. very small LFL, HID with special features, spots with very concentrated light, lights for ovens), light sources already covered by regulations for other products (e.g. electronic displays, imaging equipment), and light sources where inclusion in scope would not be worthwhile (e.g. bicycle lights).

2. Implementation of ecodesign requirements

The ecodesign requirements of the new proposed Regulation will apply from September 2021. Until then, the requirements of the three existing regulations will continue to apply. This gives suppliers sufficient time to prepare for the new requirements and allows for a smooth transition. Also, it has to be recalled that most of the requirements of the last stage (those that had to be applied by 2016) were postponed by Commission Regulation (EU) 2015/1428 to 2018, i.e. no new requirements are introduced between 2016 and 2021.

Energy efficiency requirements are now formulated for all light source types in a uniform manner, using a formula defining the maximum allowed power for a light source in function of the quantity of light emitted. This formula contains two parameters (threshold efficacy and end-loss factor) that can be set differently for each light source type where appropriate. In addition, power bonuses apply for special circumstances (presence or not of a control gear inside the light source, directional or non-directional light, light sources connected in a network, special features of the light).

For light sources typically used in households, a single efficiency requirement applies to all types. The level of this requirement is such that most LED lighting products can meet it, while halogen light sources (HL) and compact fluorescent light sources (CFLi) cannot, and thus would no longer be able to enter the market. High-efficiency LED products are already available to replace these HL and CFLi, or will be by the time the Regulation starts to apply. The only exception are linear double-capped HL with R7s caps with a light output below 2700 lm. Therefore, for these light sources this Regulation maintains the existing requirements, allowing them to remain on the market for the time being.

For light sources typically used in offices, industrial applications and street lighting, a diversified approach has been adopted. For T8 linear fluorescent light sources (LFL T8, often

used in offices), energy efficiency requirements have been set at the same level as those for LED lighting products, implying that LFL T8 will no longer be able to enter the market. Suitable LED replacements are already available for LFL T8. Where this is not the case, the Regulation includes specific exemptions.

Manufactures and importers that have recently invested in T5 linear fluorescent light sources (LFL T5) operating on electronic control gear, replacing less efficient T8 fluorescent light sources operating on less efficient electromagnetic control gear e.g. in office lighting, should be given time for their investment to pay back. The same applies for users that have recently invested in high-pressure sodium light sources (HPS) or metal-halide light sources (MH), replacing less efficient high-pressure mercury light sources (HPM) in e.g. street lighting, industrial lighting and sports lighting, because HPM were no longer on the market following Regulation (EC) No 245/2009. For compact fluorescent light sources without integrated control gear (CFLni) no higher-efficiency (LED) light sources are (yet) available that are functionally comparable and cost-effective. Hence, for LFL T5, HPS, MH and CFLni, the proposed regulation maintains the energy efficiency requirements of the existing regulations, implying that these light source types will be allowed on the market also after 2020.

The proposed Regulation does not foresee a second stage with higher energy efficiency requirements in e.g. 2023 or 2024. Although this would give a clear signal of what to expect in future (and some stakeholders are in favour of this), the lighting products market is highly dynamic in this moment, making it difficult to foresee today the situation 10 years from now. Therefore, it is proposed to define further action only during the next review.

For separate control gears, the energy efficiency requirements are essentially the same as those in the existing regulations. The requirements for LED and OLED separate control gears are also not particularly ambitious.

This Regulation aims to reduce the burden for industry and for market surveillance authorities. Most importantly, an endurance test has been included for LED and OLED products, to ensure that they maintain a minimum quality even with the higher energy efficiency limits. The duration of this test is significantly shorter than the 6000h test that is in place under the current regulations.

Other functional requirements are proposed regarding colour rendering, colour consistency, disturbance of the electricity grid and flicker and stroboscopic effects of LED and OLED light sources.

3. Verification procedure for market surveillance purposes

The procedure to be used by market surveillance authorities to verify the compliance of light sources and separate control gears in scope of this Regulation has been changed compared to the formulation in the three existing regulations. In general, the procedure has been aligned with the common approach used in Commission Regulation (EU) 2016/2282[23], which is based on verification of parameter values declared by suppliers. In addition, the required number of samples has been reduced to 10 (3 for expensive products). This will facilitate market surveillance activities and remove some ambiguities.

[23] OJ L 346, 20.12.2016, p.51.

As regards verification tolerances, the approach has been diversified, using different tolerances for different parameters, and depending on the sample size making them more realistic.

4. Date for evaluation and possible revision

The Regulation is to be reviewed no later than 1 September 2024. This revision should at least consider the topics indicated in Article 9 of the proposed Regulation.

5. Repeal

The existing ecodesign regulations for lighting products (Commission Regulations (EC) No 244/2009, No 245/2009 and No 1194/2012) will be repealed with effect from 1 September 2021. The new requirements of this Regulation will apply from that day.

Legal basis

The legal basis of Directive 2009/125/EC on the Ecodesign of Energy-related Products is Article 114 TFEU (ex Article 95 TEC)[24]. The article mentions specifically amongst others '*the establishment and functioning of the internal market'* (Art. 114.1) and a high level of protection for *'health, safety, environmental protection and consumer protection, will take as a base'*(Art.114.3).

The proposed Regulation is an implementing measure adopted pursuant to Directive 2009/125/EC, in particular Article 15(1) thereof. The legal basis for the review of the existing ecodesign regulations for lighting products is the review clause of those regulations (Article (7) or (8) depending on the Regulation).

In the Commission's Ecodesign Working Plan 2016-2019 the revision of the implementing acts for lighting products is mentioned as a major energy saving opportunity.

Subsidiarity principle

Light sources and separate control gears are global products for which it is appropriate to have the same requirements at least in the entire EU. The adoption of ecodesign measures by individual Member States, through their national legislation, would create obstacles to the free movement of goods within the EU. The three existing ecodesign regulations for lighting products have successfully avoided this. The proposed substitution of these three regulations by a single Regulation for light sources and separate control gears is a simplification that reduces the administrative burden for industry and that facilitates compliance verification by market surveillance. In line with the principle of subsidiarity, it is thus appropriate for the measures in question to be adopted at EU level.

Proportionality principle

In accordance with the principle of proportionality, this measure does not go beyond what is necessary in order to achieve the objective, which is to set harmonised ecodesign requirements for light sources and separate control gears. As clarified by the above description of the scope and the exemptions, the Regulation does not apply to many small lamps (below 60 lm light output, light sources in portable battery-operated equipment, light sources on bicycles and similar) where the administrative burden for industry and the

[24] The Treaty on the European Communities (TEC) was replaced by the Treaty on the Functioning of the European Union (TFEU) entering into force 1.12.2009, following the Lisbon Treaty of 13.12.2007. This led to the transposition of various articles, e.g. Article 95 TEC was moved to Article 114 TFEU. Ecodesign directive 2009/125/EC was defined under the TEC, whereas the recast of the Energy Labelling Directive 2010/20/EU was defined under the TFEU.

verification burden for market surveillance would outweigh the small energy savings that could be obtained.

Choice of instrument

The proposed form of action is a directly applicable Commission Regulation implementing Directive 2009/125/EC. This continues the current practice of the existing three ecodesign regulations for lighting products, while simplifying the legal framework.

4. BUDGETARY IMPLICATION

The proposal has no implications for the EU budget.

5. ADDITIONAL INFORMATION

Review/revision/sunset clause

The proposal includes a review clause.

European Economic Area

The proposed Regulation concerns an EEA matter and should therefore extend to the European Economic Area.